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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/691,219	10/22/2003	Oguz Tanrikulu	2376.2188-000	8363

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EXAMINER
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NG, EUNICE

ART UNIT	PAPER NUMBER
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2626

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02/04/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/691,219	<b>Applicant(s)</b> TANRIKULU, OGUZ	
	<b>Examiner</b> Eunice Ng	<b>Art Unit</b> 2626	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

**A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.**

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 November 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 and 72-80 is/are pending in the application.
- 4a) Of the above claim(s) 17-71 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 and 72-80 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Response to Amendment*

1. In response to the Office Action mailed 10/3/07, Applicants have submitted an Amendment, filed 11/5/07, adding new claims 72-80, without adding new matter, and electing Group 1 (claims 1-16).

### *Election/Restrictions*

2. Claims 17-71 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Groups II and III, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 11/5/07.

### *Specification*

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### *Claim Rejections - 35 USC § 112*

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 5 and 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 5 and 7 recite controlling "the level of the extended signal" and

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“a level of the generated signal in the extended signal.” It is unclear what component of the extended signal is being controlled, for example, whether it is the level of noise, power, or gain.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

7. Claims 1-5, 8-14, 16, 72-76, 78 and 79 are rejected under 35 U.S.C. 102(e) as being anticipated by Jax et al. (hereinafter “Jax”), US Patent 7,181,402.

Regarding claim 1, Jax teaches an end-terminal device bandwidth extension system comprising:

bandwidth extension circuitry for receiving a signal with frequency  $\leq 4$  KHz and providing an output signal including a signal with a narrowband component  $\leq 4$  KHz and an

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extended component  $> 4$  KHz (Abstract teaches, "synthetic widening of the bandwidth of voice signals...done by providing a narrowband voice signal at a predetermined sampling rate...envelope widening...broader band voice signal"; and col. 7, ll. 49-51 teaches, the "voice signal is band limited...transmitted bandwidth extends upward, at best, to a cut-off frequency of 4kHz.");

gain control for controlling the power of the extended signal and the narrowband signal (col. 8, ll. 4-7, teaches "output signal from the algorithm for bandwidth widening is essentially passes through a power amplifier and, finally is supplied to an acoustic front end"); and

a loudspeaker coupled to the gain control for outputting the output signal (col. 8, ll. 13-18, teaches "the loudspeaker...acoustic power which can be emitted in the linear operating range of the loudspeaker").

Regarding claim 72, the limitations of claim 72 are the same as or similar to that of claim 1, rejected above, and thus is rejected under the same rationale.

Regarding claims 2 and 73, Jax teaches a microphone and a detector for determining ambient noise from the microphone and for providing a signal to the gain control in response to the detection (col. 7, ll. 20-23, teaches, "the microphone signal contains not only the voice signal but also background noise, acoustic echoes, etc."; and col. 16, line 66 - col. 17, line 3, teaches, "Artefacts and interference which are distributed over a wide range of newly synthesized frequency components can be controlled effectively by means of a low-pass filter in which the attenuation increases only slowly as the frequencies rise").

Regarding claims 3 and 74, Jax teaches a first voice activity detector that detects the signal and mutes application of the bandwidth extension circuitry during pauses between speech signals in order to not extend spectrum of additive background noise (col. 16, line 66 - col. 17, line 3, teaches, "Artefacts and interference which are distributed over a wide range of newly synthesized frequency components can be controlled effectively by means of a low-pass filter in which the attenuation increases only slowly as the frequencies rise"; and col. 20, ll. 32-36, teaches, "[h]igh-pass like code book entries will in fact occur...in conjunction with noise-like, unvoiced stimuli, in contrast, voiced sounds are associated with tonal stimulus with low-pass-like envelope forms").

Regarding claims 4 and 75, Jax teaches a second voice activity detector operating on the input signal and sampled faster than 8 KHz is used to compute an ambient noise power in the bandwidth extended spectral range (Abstract teaches, "carrying out analysis filtering on the sampled voice signal using filter coefficients...carrying out synthesis filtering on the residual-signal-widened voice signal...produce a broader band voice signal...analysis filtering is carried out using identical filter coefficients to those used for synthesis filtering"; col. 21, ll. 12-24, teaches calculating short-term power; col. 12, ll. 12-15, teaches the "narrowband input signal is first of all interpolated by the insertion of zero values, and possibly, by low-pass filtering to produce the increased sampling rate [faster than 8KHz] at the output from the system")

Regarding claims 5 and 76, Jax teaches wherein ambient noise power is measured on the input signal to control the level of the extended signal (Abstract teaches, “analysis filtering is carried out using identical filter coefficients to those used for synthesis filtering”).

Regarding claims 8 and 78, Jax teaches wherein the input signal is up-sampled at a higher sampling frequency by using an interpolation mechanism (col. 12, ll. 12-15, teaches the “narrowband input signal is first of all interpolated by the insertion of zero values, and possibly, by low-pass filtering to produce the increased sampling rate at the output from the system”).

Regarding claim 9, Jax teaches wherein the input signal is delay compensated before applying to the gain control (col. 10, ll. 58-64, teaches signal delay  $t$ ; col. 12, ll. 29-36, teaches “[i]n order to avoid major phase errors, it is necessary for the delay times of the two parallel signal paths to be carefully matched to one another...by means of a simple delay element...overall delay times of both signal paths are exactly the same”).

Regarding claim 10, Jax teaches wherein the bandwidth extension circuitry includes an isolation filter for capturing a part of the spectrum in the 0-4 KHz range (col. 18, ll. 21-27, teaches “various methods for modifying the residual signal before and after the widening process, and hence for improving the characteristics of the output signal, such as post filters, separate processing of high-frequency and low-frequency components”).

Regarding claim 11, Jax teaches an energy mapping function implemented as a non-linear function and applied to a signal output from the isolation filter (col. 18, ll. 21-27, teaches “various methods for modifying the residual signal before and after the widening process...such as post filters, separate processing of high-frequency and low-frequency components...distinguishing between voiced and unvoiced sounds”; col. 21, ll. 23-24, teaches “energy in a signal is generally higher in voice sections than in unvoiced sounds or pauses [nonlinear]”).

Regarding claim 12, Jax teaches an output filter for capturing a part of a signal output from the energy mapping function in the extended frequency range (col. 18, ll. 21-27, teaches “various methods for modifying the residual signal before and after the widening process, and hence for improving the characteristics of the output signal, such as post filters, separate processing of high-frequency and low-frequency components...distinguishing between voiced and unvoiced sounds”).

Regarding claim 13, Jax teaches a loudspeaker compensation filter for approximately equalizing a loudspeaker frequency response (col. 12, ll. 40-48, teaches the “bandwidth widening process can influence the power level of the signal at various points; attention must therefore be paid to the ratio of the power levels in baseband and in the synthesized regions...residual signal widening block must operate in such a way that...the power level in the baseband in the output signal corresponds exactly to the power level of the input signal”).



Regarding claims 14 and 79, Jax teaches wherein the gain control combines the input signal and the extended signal so that the output energy is the same as the energy of the input signal (col. 12, ll. 40-48, teaches the “bandwidth widening process can influence the power level of the signal at various points; attention must therefore be paid to the ratio of the power levels in baseband and in the synthesized regions...residual signal widening block must operate in such a way that...the power level in the baseband in the output signal corresponds exactly to the power level of the input signal”).

Regarding claim 16, Jax teaches the isolation filtering, the energy mapping, output filtering and loudspeaker compensation filtering are generalized to work in multiple frequency bands (col. 18, ll. 21-27, teaches “various methods for modifying the residual signal before and after the widening process [covering multiple frequency bands], and hence for improving the characteristics of the output signal, such as post filters, separate processing of high-frequency and low-frequency components...distinguishing between voiced and unvoiced sounds”).

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 6, 7, 15, 77 and 80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jax et al. in view of Liljeryd et al. (hereinafter “Liljeryd”), US Patent 6,680,972.

Jax does not explicitly teach, but Liljeryd suggests a user volume control to control information used in the output gain control; a user control over a level of the generated signal in the extended signal relative to the narrowband signal; and the gain control combines the input signal and the extended signal so that the output energy is equal or about equal to a level set by a user of the end-terminal device (col. 17, ll. 13-14, teaches “[t]he gains of the signals...are adjusted according to the principles of SBR-1 or SBR-2”; col. 20, ll. 64-66, teaches “estimation is performed by continuously monitoring the envelope of the lowband and adjusting the highband spectral envelope according to specific rules”).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to allow user adjustment according to a set level or specific rule as in Liljeryd since it provides for a more versatile and customizable system.

### ***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Gustaffson *et al.* (US Patent 6,704,711), teaches a system and method for modifying speech signals. Truman *et al.* (US Patent Pub. 2003/0187663), teaches broadband frequency translation for high frequency regeneration. Truman *et al.* (US Patent Pub. 2003/0233234), teaches an audio coding system using spectral hole filling. Davidson *et al.* (US Patent Pub. 2003/0233236), teaches an audio coding system using characteristics of a decoded signal to adapt synthesized spectral components. Philippe *et al.* (US Patent Pub. 2003/0158726), teaches a spectral enhancing method and device. Abe *et al.* (US Patent 5,581,652), teaches reconstruction of wideband speech from narrowband speech using codebooks.

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11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eunice Ng whose telephone number is 571-272-2854. The examiner can normally be reached on Monday through Friday, 8:30 a.m. - 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Hudspeth can be reached on 571-272-7843. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

EN

Jan. 31, 2007

  
**DAVID HUDSPETH**  
**SUPERVISORY PATENT EXAMINER**  
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